

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application:	Young-Ho JEONG	]	Art Unit: 2611
		]	
Serial No:	10/568,007	]	Ex.: Ahn, Sung S.
		]	
Filed:	February 10, 2006	]	
For:	SYSTEM AND METHOD FOR DIGITAL MULTIMEDIA BROADCASTING		

**AMENDMENT AFTER FINAL UNDER 37 CFR 1.116**

**Mail Stop AF**

The Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

Sir:

In response to the final office action dated February 1, 2011, setting a 3-month shortened statutory period for reply ending on May 2, 2011, as May 1, 2011 fell on SUNDAY, the applicant submits the following responsive amendment in the above-identified application. This amendment is considered to place the application in better condition for allowance.

Also enclosed is the Request for One-Month Extension of Time, thereby extending the end date of the current term to June 1, 2011, accompanied by the authorization to charge the fee of (\$65.00 small entity) to Deposit Account No. 12-0400. No other fee is believed to be required, but, if this is not the case, please charge any additional fee or credit any overpayment to Deposit Account No. 12-0400.

The Commissioner is authorized to charge the fee required for the RCE (\$405.00. small entity) and others, if any, to Deposit Account No. 12-0400.

No fee is believed to be required with this amendment, but, if this is not the case, please charge the requisite fee (or credit any overpayment) to Deposit Account No. 12-0400.

**Amendments to the Claims** are reflected in the listing of claims, which begins on page 2 of this paper.

**Remarks/Arguments** begin on page 12 of this paper.

**AMENDMENTS TO THE CLAIMS**

The listing of claims presented below will replace all prior versions, and listings, of claims in the application.

**Listing of claims:**

1 – 21. (canceled)

22. **(currently amended)** A digital multimedia broadcasting system, comprising:

an **audio/video** encoding means for encoding inputted audio/video signals;

a **system systems** encoding means for objectifying data for an interactive service and synchronizing a media stream which is outputted from the encoding means, a media stream of additional data, and a media stream which is generated by objectifying the data for the interactive service;

a multiplexing means for multiplexing media streams outputted from the system encoding means;

an error correction encoding means for performing additional error correction encoding onto a media stream outputted from the multiplexing means;

an interleaving means for removing temporal correlation between adjacent byte units within a media stream outputted from the error correction encoding means; and

a **first** transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means,

wherein the **first** transmitting means is **any** one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **and or** a digital cable broadcasting system.

23. **(previously presented)** The system as recited in Claim 22, wherein the

audio/video signals are obtained by converting multimedia source data into data stream of a predetermined format through a preprocessing.

24. **(previously presented)** The system as recited in Claim 22, wherein the encoding means converts the inputted video signal into a format of 'Moving Picture Experts Group (MPEG)-4 Part 2' or a format of 'MPEG-4 Part 10', which is Advanced Video Coding (AVC).

25. **(previously presented)** The system as recited in Claim 22, wherein the encoding means converts the inputted audio signal into one of formats of 'Advanced Audio Coding (AAC)', 'Advanced Audio Coding Plus (AAC+)', and 'Bit Sliced Arithmetic Coding (BSAC)'.

26. **(currently amended)** The system as recited in Claim 22, wherein the **system** systems encoding means includes:

an Object Descriptor (OD)/Binary Format for Scene (BIFS) generating means for generating OD/BIFS for the interactive service;

an Initial Object Descriptor (IOD) generating means for generating an IOD;

and

a sync layer packetizing means for synchronizing media streams outputted from the encoding means and the OD/BIFS generating means.

27. **(previously presented)** The system as recited in Claim 26, wherein the

multiplexing means includes:

a PES packetizing means for generating a Program Elementary Stream (PES) packet based on a packet which is generated in the sync layer packetizing means based on the media stream outputted from the encoding means;

a section packetizing means for generating sections based on a data which is outputted from the IOD generating means and a packet which is generated in the sync layer packetizing means based on a OD/BIFS stream, wherein the OD/BIFS stream is outputted from the OD/BIFS generating means; and

a transport stream (TS) packetizing means for packetizing data outputted from the PES packetizing means and the section packetizing means into transport stream.

28. **(previously presented)** The system as recited in Claim 27, wherein the section packetizing means includes:

a 14496 section packetizing means for generating 14496 section based on the packet which is generated in the sync layer packetizing means based on the OD/BIFS stream; and

a Program Service Information (PSI) generating means for generating PSI based on the data outputted from the IOD generating means.

29. **(previously presented)** The system as recited in Claim 22, wherein the error correction encoding means is a Reed-Solomon (RS) encoder.

30. **(previously presented)** The system as recited in Claim 22, wherein the interleaving means is composed of 12 branches and the branches individually include a plurality of memories having a 17bytes x N unit where  $N=0, 1, 2, \dots, 11$ , and input/output switches operating in synchronization with each other; sync words are transmitted always through a '0' branch for synchronization; and synchronization of a deinterleaver is acquired by allocating a first recognized sync word to the '0' branch of the deinterleaver.

31. **(previously presented)** The system as recited in Claim 22, further comprising an Ensemble Transport Interface (ETI) converting means for converting the digital multimedia broadcasting media stream outputted from the interleaving means into an ETI frame and delivering the ETI frame to the transmitting means.

32. **(previously presented)** The system as recited in Claim 22, further comprising an Internet Protocol (IP) datagram converting means for converting the digital multimedia broadcasting media stream outputted from the interleaving means into an IP datagram and delivering the IP datagram to the transmitting means.

33. **(currently amended)** A digital multimedia broadcasting system, comprising:  
a **first** receiving means for receiving digital multimedia broadcasting media stream;  
a deinterleaving means for deinterleaving the received digital multimedia broadcasting media stream which is interleaved to remove temporal correlation in

adjacent byte units;

an error correction decoding means for performing additional error correction decoding onto the deinterleaved digital multimedia broadcasting media stream which is generated from additional error correction encoding;

a demultiplexing means for demultiplexing the additional error correction decoded digital multimedia broadcasting media stream which is multiplexed;

a **system systems** decoding means for decoding the demultiplexed digital multimedia broadcasting media stream to produce media stream, additional data, and data objectified for an interactive service; and

a **an audio/video** decoding means for decoding the media stream into audio/video signals,

wherein the **first** receiving means is **any** one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **and or** a digital cable broadcasting system.

34. **(previously presented)** The system as recited in Claim 33, wherein the decoding means decodes a video signal included in the media stream based on 'Moving Picture Experts Group (MPEG)-4 Part 2' or 'MPEG-4 Part 10' which is Advanced Video Coding (AVC).

35. **(previously presented)** The system as recited in Claim 33, wherein the decoding means decodes an audio signal included in the media stream based on one of 'Advanced Audio Coding (AAC)', 'Advanced Audio Coding Plus (AAC+)', and 'Bit Sliced

Arithmetic Coding (BSAC)'.

36. **(previously presented)** The system as recited in Claim 33, wherein the error correction decoding means is a Reed-Solomon (RS) decoder.

37. **(currently amended)** A digital multimedia broadcasting method, comprising the steps of:

- a) encoding inputted audio/video signals **inputted into a first receiving device**;
- b) objectifying data for an interactive service and synchronizing a media stream which is outputted from the step a), a media stream of additional data, and a media stream which is generated by objectifying the data for the interactive service;
- c) multiplexing the media streams outputted from the step b);
- d) performing additional error correction encoding onto a media stream outputted from the step c);
- e) performing interleaving to remove temporal correlation between adjacent byte units within a media stream outputted from the step d); and
- f) transmitting a digital multimedia broadcasting media stream outputted from the step e),

wherein the step f) is performed by using **any** one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **and or** a digital cable broadcasting system.

38. **(previously presented)** The method as recited in Claim 37, wherein the

audio/video signals are obtained by converting multimedia source data into data stream of a predetermined format through a preprocessing.

39. **(previously presented)** The method as recited in Claim 37, wherein the step a) converts the inputted video signal into a format of 'Moving Picture Experts Group (MPEG)-4 Part 2' or a format of 'MPEG-4 Part 10', which is Advanced Video Coding (AVC).

40. **(previously presented)** The method as recited in Claim 37, wherein the step a) converts the inputted audio signal into one of formats of 'Advanced Audio Coding (AAC)', 'Advanced Audio Coding Plus (AAC+)', and 'Bit Sliced Arithmetic Coding (BSAC)'.

41. **(previously presented)** The method as recited in Claim 37, wherein the step b) includes the steps of:

b1) generating an Object Descriptor (OD)/ Binary Format for Scene (BIFS) for the interactive service;

b2) generating an Initial Object Descriptor (IOD); and

b3) performing a sync layer packetization to synchronize media streams outputted from the step a) and the step b1).

42. **(previously presented)** The method as recited in Claim 41, wherein the step c) includes the steps of:



c1) generating a Program Elementary Stream (PES) packet based on a packet which is generated in the step b3) based on the media stream outputted from the step a);

c2) generating sections based on a data which is outputted from the step b2) and a packet which is generated in the step b3) based on a OD/BIFS stream, wherein the OD/BIFS stream is outputted from the step b1); and

c3) packetizing data outputted from the step c1) and the step c2) into transport stream.

43. **(previously presented)** The method as recited in Claim 42, wherein the step c2) includes the steps of:

c21) generating 14496 section based on the packet which is generated in the step b3) based on the OD/BIFS stream; and

c22) generating PSI based on the data outputted from the step b2).

44. **(previously presented)** The method as recited in Claim 37, wherein the step d) is performed in a Reed-Solomon (RS) encoder.

45. **(previously presented)** The method as recited in Claim 37, wherein the step e) is performed in an interleaving means which is composed of 12 branches and the branches individually include a plurality of memories having a 17bytes x N unit where  $N=0, 1, 2, \dots, 11$ , and input/output switches operating in synchronization with each other; sync words are transmitted always through a '0' branch for synchronization; and

synchronization of a deinterleaver is acquired by allocating a first recognized sync word to the '0' branch of the deinterleaver.

46. **(previously presented)** The method as recited in Claim 37, further comprising the step of:

g) converting the digital multimedia broadcasting media stream outputted from the step e) into an ETI frame and delivering the ETI frame to the step f).

47. **(previously presented)** The method as recited in Claim 37, further comprising the step of:

h) converting the digital multimedia broadcasting media stream outputted from the step e) into an IP datagram and delivering the IP datagram to the step f).

48. **(currently amended)** A digital multimedia broadcasting method, comprising the steps of:

a) receiving digital multimedia broadcasting media stream **inputted into a first receiving device**;

b) deinterleaving the received digital multimedia broadcasting media stream which is interleaved to remove temporal correlation in adjacent byte units;

c) performing additional error correction decoding onto the deinterleaved digital multimedia broadcasting media stream which is generated from additional error correction encoding;

d) demultiplexing the additional error correction decoded digital multimedia

broadcasting media stream which is multiplexed;

e) decoding the demultiplexed digital multimedia broadcasting media stream to produce media stream, additional data, and data objectified for an interactive service; and

f) decoding the media stream into audio/video signals,

wherein the step a) is performed by using any one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **and or** a digital cable broadcasting system.

49. **(previously presented)** The method as recited in Claim 48, wherein the step f) decodes the video signal included in the media stream based on 'Moving Picture Experts Group (MPEG)-4 Part 2' or 'MPEG-4 Part 10' which is Advanced Video Coding (AVC).

50. **(previously presented)** The method as recited in Claim 48, wherein the step f) decodes the audio signal included in the media stream based on one of 'Advanced Audio Coding (AAC)', 'Advanced Audio Coding Plus (AAC+)', and 'Bit Sliced Arithmetic Coding (BSAC)'.

51. **(previously presented)** The method as recited in Claim 48, wherein the step c) is performed in a Reed-Solomon (RS) decoder.

### **REMARKS/ARGUMENTS**

The final office action mailed on February 1, 2011, has been reviewed and carefully considered. Reconsideration is respectfully requested.

#### **Amendments to the Claims**

Claims 22-51 were pending in the present application prior to this amendment. Claims 22-51 are now pending in the present application; among them, claims 22, 33, 37 and 48 are independent claims. Claims 22, 26, 33, 37, and 48 been amended. No new matter has been added.

#### **Drawings**

In the final office action (page 3), the drawings stand objected to under 37 CFR 1.83(a) because they fail to show detail of system decoding means for decoding the demultiplexed digital multimedia broadcasting media stream to produce media stream, additional data, and data objectified for an interactive service similar to details of systems encoder of FIG. 4. In response, the Applicants respectfully state that details of a system decoding means are not required to be shown in the drawings because the features of claims 33-36 and 48-51 are disclosed in the Fig. 3A of the presently claimed invention. Also, the Applicants respectfully state that the subject application of the presently claimed invention does not have any claims regarding the details of systems decoding means of the receiver. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

#### **Claim Objections**

In the final office action (page 4), claims 22-37 stands objected to because of informalities. In response, the claims have been amended in accordance with the examiner's comment. Therefore, withdrawal of the aforementioned objection to claims 22-37 is respectfully requested.

Claim Rejections - 35 U.S.C. §103

In the final office action (page 5), claims 22-23, 26-30, 33, 37-38, 41-45, 48 and 51 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Publication No. 2002/0080887 (Jeong) in further view of WO 02/058388 (Ahn).

In the final office action (page 14), claims 24-25, 34-35, 39-40, 49 and 50 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jeong in view of Ahn, and further in view of White Paper "AVC + AAC The Next Generation of Compression" (Harmonic).

In the final office action (page 15), claims 31 and 46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jeong in view of Ahn, and further in view of European Telecommunication Standard Institution Draft for Digital Audio Broadcasting (DAB) Ensemble Transport Interface to ETSI.

In the final office action (page 16), claims 32 and 47 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jeong in view of Ahn, and further in view of U.S. Patent No. 7,492,786 (Ferris).

The applicants have amended claim 22 (and similarly independent claims 33, 37, and 48) to clarify the presently claimed invention..

**Comments for 103 Rejections**

Referring to claim 22 of the presently claimed invention, the claimed transmitting from a same transmitting device is **any one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, or a digital cable broadcasting system**. Each and every element of claim 22 is introduced in order to secure stable reception quality of multimedia data in a mobile channel environment and to embody efficient interactive multimedia data broadcasting, when multimedia data is transmitted using one of a digital audio broadcasting system and any one of the other diverse digital broadcasting systems.

In other words, **all** of the elements in claim 22 are required to achieve a new

digital multimedia broadcasting transmission scheme for transmitting high quality multimedia data though by a same transmitting/receiving device, which is compatible with the transmission standard of the transmitting means (one of a digital audio broadcasting (DAB) system and any one of the other diverse digital broadcasting systems). Accordingly, nowhere do any of the cited references discloses, suggests, or mentions each and every one of the above mentioned features of claim 22 (and similarly claims 33, 37, and 48), which recites: --a **first** transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means, wherein the **first** transmitting means is **any** one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **or** a digital cable broadcasting system--. Independent claims 33, 37 and 48 recites analogous limitation recited in new independent claim 22. Therefore, for reasons analogous to those argued above with respect to claim 22, claims 33, 37, and 48 should also be patentable over the applied references. Accordingly, independent claim 22 (and similarly independent claim 33, 37, and 48) now recites, *inter alia*:

--a **first** transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means, wherein the **first** transmitting means is **any** one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, **and or** a digital cable broadcasting system--.

Support for the new independent claims 22, 33, 37, and 48 are found in the specification at least at page 8, lines 5-19 and FIGs. 2A and 2B.

Applicants respectfully submit that nowhere in any of the cited references disclose or suggest the above-identified features of claim 22 (and similarly claims 33, 37, and 48) of the presently claimed invention. Specifically, the cited prior art references are silent with respect to: the same transmitting/receiving device transmits and receives from **any one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, or a digital cable broadcasting system**. The applicants respectfully point out that every element of claim 22 (and similarly claims 33, 37, and 48) is introduced in order to secure stable

reception quality of multimedia data in a mobile channel environment and to embody efficient interactive multimedia data broadcasting, when multimedia data is transmitted using one of a digital audio broadcasting system and other diverse digital broadcasting systems.

Fig. 2A and 2B of the presently claimed invention show diagrams for describing a transmission method of a digital multimedia broadcasting (DMB) system as follows.

“First, at the steps 201 and 202, high-efficiency source encoding for compressing multimedia data is performed and, at the step 204, objectification for interactive service is performed. Then, at the step 210, video/audio/additional data streams are synchronized and, at step 220, the media streams are multiplexed.

Subsequently, at step 230, error correction encoding and interleaving are performed on the multiplexed stream in order to secure excellent reception quality in a high-speed mobile channel environment. The stream obtained by using the error correction encoding and the interleaving is **transmitted to the DAB system and other digital broadcasting systems. Herein, the digital broadcasting systems include a digital television (TV) broadcasting system, a digital satellite broadcasting system, and a digital cable broadcasting system**”,

(specification at page 8, lines 4-19 [**emphasis** added]).

As described above, the presently claimed invention transmits and receives multimedia data efficiently from a same device and stably based on the DAB system and any one of the other diverse digital broadcasting systems in order to provide diverse interactive broadcasting service having an excellent reception performance without breaks by compressing video and multimedia data efficiently, (i.e.; supporting an interactive service through interaction and synchronization between objects) by processing the video and multimedia data on an object basis, multiplexing video/audio/additional data stably, endowing robustness against multipath fading and the Doppler effect that occur in a mobile channel environment by using an additional error correcting method.

Accordingly, the presently claimed invention provides an interactive multimedia data service by using the conventional DAB system and any one of the other diverse digital broadcasting systems, where the presently claimed **invention transmits or receives multimedia data of diverse formats from a single transmitting or**

**receiving device data from for example as a mobile TV, Differential Global Positioning System (DGPS), Location Based Service (LBS), Pay Per View (PPV), traffic information, stock information, weather forecast and the like.**

Also, the presently claimed invention maximizes the spectrum use efficiency by using highly efficient multimedia data compression technology and it embodies a multimedia data service efficiently by adding a DMB processing module to the conventional DAB and any one of the other diverse digital broadcasting systems.

Therefore, the applicants respectfully submit that the cited prior art references fails to disclose or suggest each and every one of the limitations recited in claim 22 (and similarly claims 33, 37, and 48) of the presently claimed invention, which recites: --a first transmitting means for transmitting a digital multimedia broadcasting media stream outputted from the interleaving means, wherein the first transmitting means is any one of a digital audio broadcasting system, a digital television (TV) broadcasting system, a digital satellite broadcasting system, or a digital cable broadcasting system--.

Thus, the applicants respectfully submit that claim 22 (and similarly claims 33, 37, and 48) is in condition for allowance over the applied references.

## **DEPENDENT CLAIMS**

The other new claims are dependent from either independent claim 22, claim 33, claim 37, or claim 48 discussed above for claim 22, where claims 33, 37, and 48 recite similar features recited in claim 22. Thus, dependent claims 22, 33, 37, and 48 are therefore believed patentable for at least the same reasons mentioned above for claim 22. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

## **Conclusion**

For the reasons set forth above, the applicant respectfully submits that claims 22-51, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicant respectfully requests reconsideration and



withdrawal of the outstanding rejections and earnestly solicits an indication of allowable subject matter.

This amendment is considered to be responsive to all points raised in the office action. The examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve any remaining questions or concerns.

Respectfully submitted,

Dated: June 1, 2011

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